TECHNICAL NOTE

Validation of Ceiling Jet Flows in a Large Corridor with Vents Using the CFD Code JASMINE: Errata and Additional Remarks

Heimo Tuovinen
Swedish National Testing and Research Institute, Borås, SWEDEN
Leonard Y. Cooper
National Institute of Standards and Technology, Gaithersburg, Maryland

Abstract

This paper identifies and corrects errata and provides additional clarifying remarks on the previously published paper.[1]

Introduction

Errors in Figures 6a and 6b contained in the published paper have been identified. It is the purpose of this Technical Note to identify and correct these errata and to provide additional clarifying remarks.

Errata and Clarifying Remarks

According to the figure captions of the published paper, the plots of Figures 6a and 6b include calculated and experimentally measured results for gas velocity and temperature distributions through the depth of the ceiling jet at the radial position r=4 m and at the three times t=120 s, 240 s, and 360 s. As it turns out, what is in fact plotted in these two figures is a mix of results for r= 2 m (from LAVENT[2,3] calculations) and for r=4 m (from JASMINE[4] calculations and from experimental data[5]).

Regarding Figures 6a through 6d in the published paper, it is worthwhile noting that the plotted LAVENT-generated results include only relatively few calculated points. Such plots do not adequately highlight the capability of the LAVENT model/computer code to easily predict and present as computed output complete, "smooth" ceiling-jet velocity and temperature profiles, including the near-ceiling boundary-layer-like features of these profiles (for example, velocity rising from zero at the ceiling surface to a maximum value and dropping asymptotically to zero in the far field).

Corrected and revised versions of Figures 6a and 6b of the published paper and revised versions of Figures 6c and 6d, all of which include enhanced pre-

sentations of the LAVENT-generated velocity and temperature profiles, have been prepared and are included here. As can be seen in the two corrected figures, the temperatures shown in the revised Figure 6a and, even more notably, the velocities reported in the revised Figure 6b show reasonably good agreement between the experimentally measured full-scale data and the LAVENT-generated predictions.

References

1. Tuovinen, H., "Validation of Ceiling Jet Flows in a Large Corridor with Vents Using the CFD Code JASMINE," *Fire Technology*, Vol. 32 (1996), No. 1, pp. 25–49.

2. Cooper, L. Y., "Estimating the Environment and the Response of Sprinkler

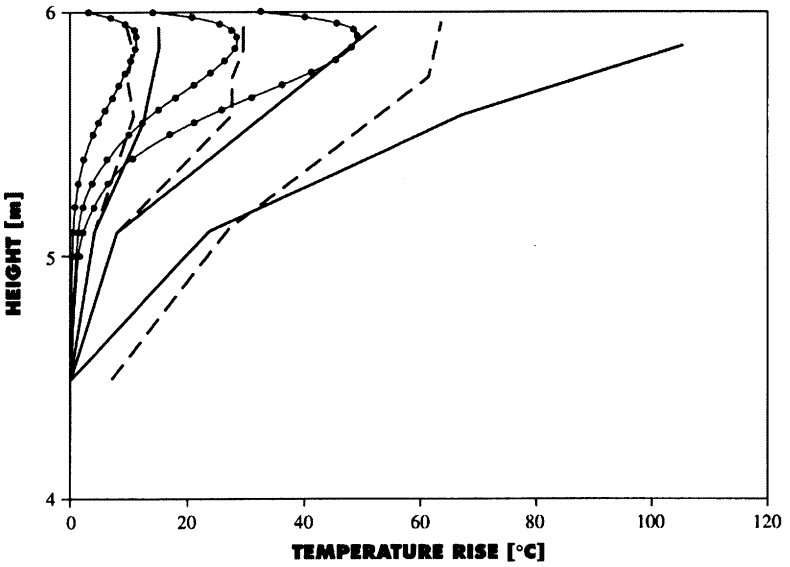

Figure 6a (revised). Comparison of ceiling jet profiles of temperature and velocity with CFD calculations and experiments. Temperature is measured 4 m from the fire. Note: Figures 6a through 6d show LAVENT, Borås tests, and present JASMINE simulations with medium fire growth rates. The three sets of curves (dotted, dashed, and solid) represent the calculation and measurements at three different times, 2, 4, and 6 min after ignition. The longer the time after ignition, the higher the maximum value of temperature and velocity. The dotted curve equals values from the Borås test, and the solid curve equals values from the JASMINE simulations.

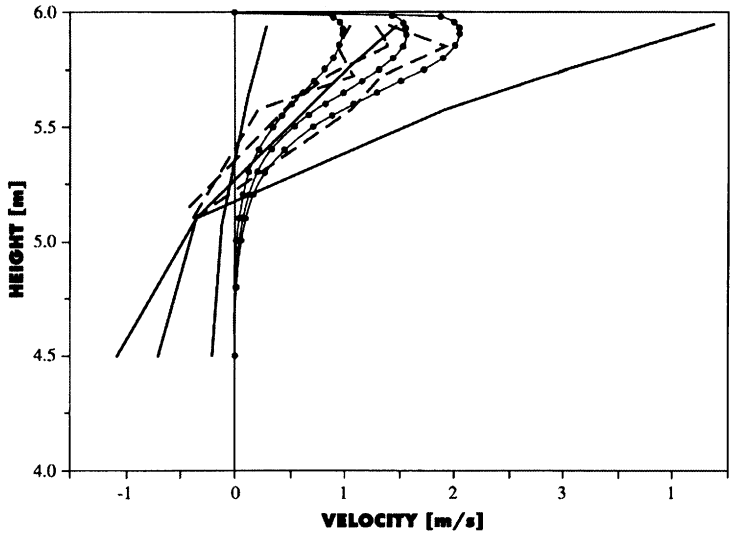

Figure 6b (revised). Comparison of ceiling jet profiles of temperature and velocity with CFD calculations and experiments. Velocities are measured 4 m from the fire.

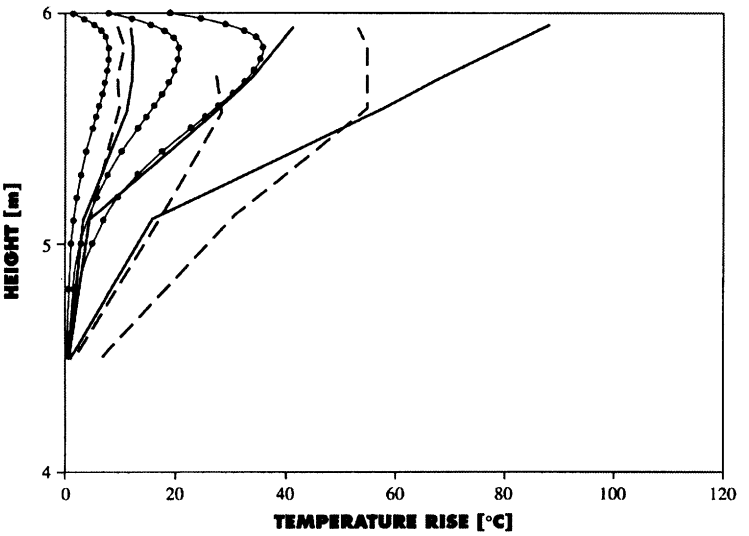

Figure 6c (revised). Comparison of ceiling jet profiles of temperature and velocity with CFD calculations and experiments. Temperatures are measured 6 m from the fire.

Links in Compartment Fires with Draft Curtains and Fusible Link Actuated Ceiling Vents—Theory," *Fire Safety Journal,* Vol. 16 (1990), pp. 137-163.

3. Davis, W. D. and Cooper, L. Y H., "Estimating the Environment and the Response of Sprinkler Links in Compartment Fires with Draft Curtain and Fusible-Line-Actuated Ceiling Vents—Part II: User Guide for the Computer Code LAVENT," NISTIR 89-4122, National Institute of Standards and Technology, Gaithersburg, MD, 1989.

4. Cox, G. and Chamber, S., "Field Modeling of Fire in Forced Ventilation Enclosures," *Combustion Science and Technology,* Vol. 52 (1987).

5. Ingason, H. and Olsson, S., "Interaction Between Sprinklers and Fire Vents," SP-REPORT 1992:11, Swedish National Testing Institute, Borås, Sweden, 1992.

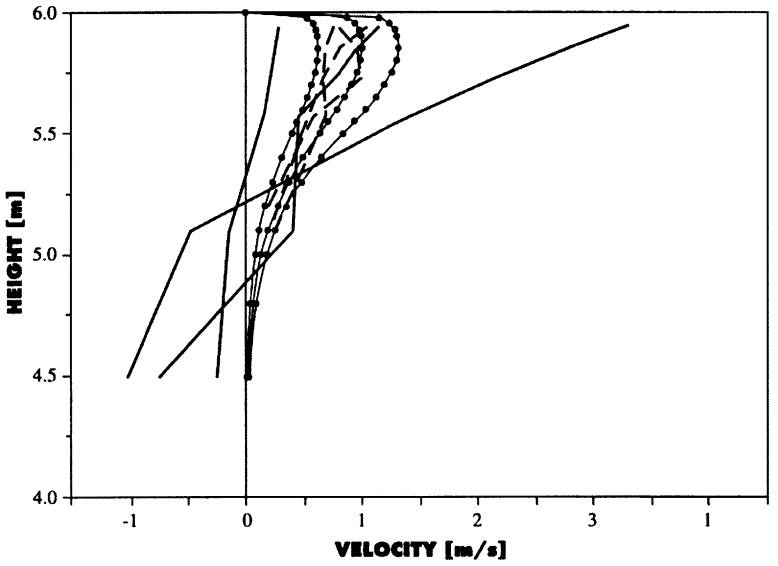

Figure 6d (revised). Comparison of ceiling jet profiles of temperature and velocity with CFD calculations and experiments. Velocities are measured 6 m from the fire.